

REMARKS/ARGUMENTS

Reconsideration of the above-identified application is respectfully requested.

Claims 6-18 remain as previously presented.

Applicants' attorney contacted the Examiner by telephone concerning the length of the shortened statutory period of response set for this second non-final office action. The Examiner confirmed that the shortened statutory period of response is 3 months. According, no extension of time is believed necessary. However, in the event that Applicants' understanding is incorrect, a provisional petition for a two-month extension of time is hereby made and the Commissioner is hereby authorized to charge the fee for any extension of time deemed necessary to deposit account 03-0835 in the name of Carrier Corporation.

Claims 6-18 stand rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-5 of U.S. Patent No. 6,679,080 in view of Graves, U.S. Patent No. 3,788,089 and Renard, U.S. Patent No. 5,502,979. It is the Examiner's position that claims 6-11 and 14 are read by claim 1 or claim 5 of U.S. Patent 6,679,080 except for a refrigerated temperature above 32 degrees F, which the Examiner cites Graves as teaching. For claims 13, 16 and 18, the Examiner cites Renard as teaching a draw through air flow arrangement through an evaporator with at least one fan.

The Examiner indicates that a timely filed terminal disclaimer in compliance with 37 CFR 1.321(d) or 1.321(d) may be used to overcome an actual or provisional rejection based on the ground of nonstatutory obviousness-type double patenting. Applicants respectfully submit that the terminal disclaimer filed August 3, 2006, in response to the first non-final office action mailed March 13, 2006, overcomes this rejection of claims 6-18 based on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-5 of U.S. Patent No. 6,679,080 in view of Graves, U.S. Patent No. 3,788,089 and Renard, U.S. Patent No. 5,502,979. The subject application is a continuation of U.S. patent application 09/849,209 upon which the '080 patent has issued, both the '080 patent and any patent that may issue on the subject application will have the same statutory term expiration date of May 4, 2021, and are commonly owned. A check of the Public Pair shows that on August 16, 2006, the Office issued an internal document indicating that the terminal disclaimer mailed August 3, 2006, was approved.

Accordingly, Applicants respectfully request that the rejection of claims 6-18 based on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-5 of U.S. Patent No. 6,679,080 in view of Graves, U.S. Patent No. 3,788,089 and Renard, U.S. Patent No. 5,502,979, be withdrawn.

Claims 6-11, 13-14, 16 and 18 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Renard, U.S. Patent 5,502,979, in view of Kutscher et al., U.S. Patent 6,378,605. The Examiner cites Renard as disclosing a refrigerated display cabinet comprising an insulated cabinet 50 defining a product display area/shelves 1 maintained in a refrigeration condition at a temperature above 32 degree F and having a compartment 37 separate from the product display area 1, an evaporator 28 disposed in the compartment 37; at least one air circulator 29 disposed within the compartment 37 in cooperative relationship with the evaporator 28; and an air circulation circuit (23-26) connecting the product display area 1 and in direct flow communication with the compartment 37. The Examiner concludes that Renard discloses the invention substantially as claimed, but concedes that Renard does not disclose a relatively high airside pressure drop evaporator. The Examiner cites Kutscher et al. as teaching the use of a high airside pressure drop heat exchanger 10 with a fin density ranging from 3 fins to 10 fins per inch in a heat exchanging system for the purpose of controlling pressure drop. The Examiner also cites Kutscher et al. as disclosing a draw through flow by the action of fan 12, referring specifically to Figure 1 and column 12, lines 31-67. It is the opinion of the Examiner that it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have modified the refrigerated display cabinet of Renard in view of Kutscher et al. such that a high airside pressure drop heat exchanger with a fin density ranging from 3 to 10 fins per inch could be provided in order to run a refrigeration system. Applicants respectfully traverse this rejection.

The Examiner's response to Applicants' Remarks filed 8/3/2006 with respect to the prior rejection of claims 6-11, 13-14, 16 and 18 has been considered. Applicants acknowledge that Kutscher et al. recognize that a higher fin density heat exchanger will characteristically exhibit a higher air-side pressure drop relative to a lower fin density heat exchanger. However, Applicants respectfully submit that Kutscher et al. can not be read to teach or motivate one having ordinary skill in the art to provide a relatively high air side pressure drop evaporator in the environment of a medium temperature refrigerator such as in Renard wherein the evaporator is subject to frost formation on the

fins due to the presence of moisture in the air passing from the refrigerated food storage compartment of the refrigerator and through the space between the fins of the evaporator.

Applicants' invention is directed at providing a medium temperature refrigerated merchandiser, i.e. a merchandiser having a refrigerated food display case at a temperature above 32 degreed F, having an improved air flow distribution entering the evaporator whereby the evaporator will be characterized by a relatively more uniform exit air temperature across the length of the evaporator. It is well appreciated by those of ordinary skill in the art of refrigeration that the evaporator of a medium temperature merchandiser will be subject to frost formation on the fins due to the presence of moisture in the air passing from the refrigerated food storage compartment of the refrigerator and through the space between the fins of the evaporator. For decades, it has been conventional practice in the prior art to employ only low fin density heat exchangers as evaporators whereby the spacing between neighboring fins will be large enough to limit frost bridging the space between neighboring fins which would block air flow thereby worsening air flow maldistribution through the evaporator and adversely impacting overall evaporator performance.

Contrary to conventional wisdom, Applicants invention provides a medium temperature refrigerated merchandiser having a relatively high air side pressure drop evaporator (Claim 6). In an embodiment, the relatively high air side pressure drop evaporator may comprise a fin and tube heat exchanger having a fin density of at least 6 fins per inch (claim 9). In an embodiment, the relatively high air side pressure drop evaporator may comprise a fin and tube heat exchanger having a fin density in the range of 6-15 fins per inch (claim 10). The air flow velocity profile leaving the evaporator of a unit having a relatively high fin density will be more uniform than the air flow velocity profile leaving the evaporator of a conventional prior art unit equipped with a relatively low fin density evaporator. At the time the invention was made, the accepted practice in medium temperature refrigerated merchandiser design was to use a relatively low fin density evaporator, i.e. typically from 2 to 4 fins per inch, in view of the desire to delay frost bridging between fins as frost builds up during operation of a medium temperature refrigerated merchandiser. Applicants respectfully submit that the fact that the Examiner has not found a single reference disclosing a medium temperature refrigerated

merchandiser equipped with a relatively high pressure drop evaporator of any design to provide a more uniform air flow distribution through the evaporator as a means of alleviating excessive localized frost formation due to air flow maldistribution is strong evidence of the non-obviousness of Applicants invention and further indicates the Applicants' invention is contrary to the conventional wisdom in the art and that there is no motivation in the prior art to do so.

The general object of Kutscher et al. is to provide a gas-fluid heat exchanger having increased heat transfer per degree of temperature difference between the gas flowing over the finned tubes and the fluid passing through the tubes (UA) and improved ratio of UA to pressure drop (see column 3, lines 58-60). Kutscher et al. teach doing so (see column 5, lines 53-58) by enhancing the heat transfer coefficients of a fin and tube heat exchanger by increasing the gas side heat transfer coefficient and minimizing the gas side pressure drop. Kutscher et al. does not at all address the issue of, or even recognize the problems attendant to, frost formation and build-up between closely spaced fins. Applicants respectfully submit that Kutscher et al. fail to do so because they did not intend their higher fin density, porous fin heat exchanger to be employed in the environment of a medium temperature refrigerated merchandiser wherein frost formation would be a performance issue.

Only Applicants teach using a relatively high air-side pressure drop evaporator in such an application to more evenly distribute air flow through the evaporator. Applicants respectfully submit that one having ordinary skill in the art would at least have been motivated, at the time the invention was made, by Kutscher et al. to select the low fin density embodiment of the heat exchanger Kutscher et al., in accord with the conventional wisdom of desiring a low pressure drop and wide fin spacing for frosting applications. There is no teaching or motivation in Kutscher et al. that would have led one designing a medium temperature refrigerated merchandiser to go against the conventional wisdom at the time of the invention and instead select a high fin density embodiment of the heat exchanger of Kutscher et al. providing a high airside pressure drop evaporator. Accordingly, Applicants respectfully submit that one skilled in the art on the time of the invention, applying the teachings of Kutscher et al. to Renard would select an evaporator having a wider fin spacing and no higher pressure drop than the original Renard evaporator, which would not improve air flow uniformity.

Accordingly, Applicants respectfully request that the Examiner withdraw the rejection of claims 6-11, 13-14, 16 and 18 under 35 USC 103(a) as being unpatentable over Renard, U.S. Patent 5,502,979, in view of Kutscher et al., U.S. Patent 6,378,605.

Claims 12, 15 and 17 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Renard, U.S. Patent 5,502,979, in view of Kutscher et al., U.S. Patent 6,378,605, and further in view of Navarro, U.S. Patent 6,145,327. The Examiner concludes that Renard in view of Kutscher et al., as applied to claims 6, 9 and 10 above, discloses the invention substantially as claimed, but concedes that Renard in view of Kutscher et al. does not disclose a plurality of fans. The Examiner cites Navarro as teaching the use of a plurality of fans 16 along an evaporator coil 17 in a refrigerated case for the purpose of running a refrigeration system, referring specifically to Figure 7. The Examiner concludes that it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have modified the refrigerated display cabinet of Renard in view of Kutscher et al. and further in view of Navarro such that a plurality of fans could be provided in order to run a refrigeration system. The Examiner considers the spacing of the fans at a specific distance of two feet to be an obvious design choice of the individual skilled in the art absent any critically or unexpected result from it.

Applicants respectfully traverse this rejection.

Applicants admit that Navarro discloses a refrigerated display case having a plurality of fans. However, Navarro does not teach, disclose or even suggest the use of a plurality of fans in combination with a relatively high air side pressure drop evaporator, as taught by Applicants. Nor does Navarro recognize the advantage of using a plurality of fans in combination with a high air side pressure drop as taught by Applicants. The use of a plurality of fans in conjunction with a high air side pressure drop evaporator results in a more uniform distribution of air flow through the evaporator. Applicants respectfully submit that there is no teaching or disclosure in Navarro, taken alone or in combination with Kutscher et al., that would lead one having ordinary skill in the art to replace the finned evaporator/air circulation fan assembly of Renard with a plurality of fans in association with a high air side pressure drop evaporator as taught by Applicants. Applicants respectfully request that the Examiner withdraw the rejection of claim 12, 15 and 17 under 35 USC 103(a) as being unpatentable over Renard, U.S. Patent 5,502,979, in view of Kutscher et al., U.S. Patent 6,378,605 and further in view of Navarro, U.S. Patent 6,145,327.

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In view of the terminal disclaimer submitted herewith and the arguments presented herein, Applicants respectfully request that the Examiner reconsider all rejections of the claims as now presented, and upon reconsideration withdraw all rejections of now pending claims 6-18, and pass claims 6-18 to allowance.

If the Examiner wishes to expedite disposition of the above-captioned patent application, he is invited to contact Applicant's representative at the telephone number below.

The Commissioner is hereby authorized to charge any additional fees associated with this communication or credit any overpayment to Deposit Account No. 03-0835.

Respectfully submitted,
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